

WHAT IS CLAIMED IS:

1. An engine control system and engine, in combination, comprising:

at least one engine electronic control module that controls engine operation in normal operating conditions in accordance with software and includes calibrations for engine control, the engine module having a primary shut down system programmed to shut down the engine if one or more of a plurality of engine operation sensors deviates from an acceptable level; and

at least one shut down system electronic control module that is programmed to shut down the engine if one or more of the plurality of engine operation sensors deviates from the acceptable level.

2. The engine control system of claim 1 wherein the engine and shut down system electronic control modules are structurally identical but are programmed differently so that the engine module provides full engine control functions including the software for engine shut down and the shut down system module has software to provide engine shut down.

3. The engine control system of claim 1 wherein the engine and shut down system electronic control modules are both programmed to provide full engine control functions including the software for engine shut down so that the shut down system electronic control module can be used in place of the engine electronic control module.

4. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor a coolant temperature to determine if it is above a threshold level.

5. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor an oil temperature to determine if it is above a threshold level.

6. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules establish a value corresponding to an exhaust temperature to determine if it is above a threshold level.

7. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor engine vibration to determine if it is above a threshold.

8. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules establish a value corresponding to a turbocharger compressor outlet temperature to determine if it is above a threshold.

9. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor an oil pressure to determine if it is above a threshold.

10. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor a coolant level to determine if it is below a threshold.

11. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor an engine oil level to determine if it is below a threshold.

12. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor an engine RPM value to determine if it is above a threshold.

13. The engine control system of claim 1 wherein both the engine and shut down system electronic control modules monitor an intercooler temperature to determine if it is above a threshold.

14. The engine control system of claim 1 wherein the electronic control modules monitor a gas detection sensor for sensing the presence of potentially dangerous gases in the air around the engine.

5 15. The engine control system of claim 1 wherein the electronic control modules monitor a transmission temperature indicating system.

16. The engine control system of claim 1 wherein if any of the engine operation sensors indicates a deviation from the acceptable level and the primary shut down device fails to shut down the engine, the shut down system module will trigger an external shut down system.

10 17. The engine control system of claim 16 wherein the external shut down system is a Halon injection system.

18. The engine control system of claim 16 wherein the external shut down system is an air shut off valve.

15 19. The engine control system of claim 1 wherein if any of the engine operation sensors indicates a deviation from the acceptable level and the primary shut down system fails to shut down the engine, the shut down system will activate an alarm.

20 20. The engine control system of claim 1 wherein if any of the engine operation sensors indicates a deviation from the acceptable level and the primary shut down system fails to shut down the engine, the redundant shut down system will send a shut down command to the engine electronic control module by a digital communication link.